

doubt, as synonyms of his *A. allegheniensis*, the three following: *Spiraea Aruncus*, β . *hermaphrodita* Michx. Fl. Bor.-Am. i. 294 (1803); *S. Aruncus*, β . *americana* Pers. Syn. ii. 46 (1806); and *S. americana* Steud. Nom. Bot. 805 (1821). These all rest on one type, Persoon merely having substituted β . *americana* for Michaux's name and Steudel (bunglingly) resting his *S. americana* on the same plant. Now, ARUNCUS DOES NOT HAVE THE FLOWERS HERMAPHRODITE and when Michaux got hold of a plant in the Alleghenies which looked like the European *Spiraea Aruncus* but differed "floribus . . . hermaphroditis-fertilibus" he called it var. *hermaphrodita*. *Astilbe biternata* (Vent.) Britton, of the *Saxifragaceae*, does have hermaphrodite flowers. It grows side-by-side with *Aruncus allegheniensis* and so completely mimics it that only by detailed examination of the flowers and fruits can the two be readily separated. *Spiraea Aruncus*, β . *hermaphrodita* of Michaux was, as to the defined characters, *Astilbe*. This was the judgment of Torrey & Gray, in 1840: "The variety with perfect flowers, first mentioned by Michaux, is probably *Astilbe decandra* (*Tiarella biternata*, Vent.), which in habit strikingly resembles this plant."—Torr. & Gr. Fl. N. Am. i. 417 (1840). If *Spiraea Aruncus*, β . *hermaphrodita* Michx. is *Astilbe*, then, automatically, *S. Aruncus*, β . *americana* Pers. and *S. americana* Steud. are likewise *Astilbe*; and perhaps *Aruncus americanus* Raf. may, by inference, be also associated with *Astilbe*. At least, Rydberg was quite justified in giving the Alleghenian species a new and properly defined name.

Very recently further confusion has been made by a Japanese botanist, Hara, who unjustifiably adopts Rafinesque's NOMEN NUDUM *Aruncus vulgaris* to displace *A. sylvester* and then coins for the Alleghenian plant the unfortunate combination *A. vulgaris*, var. *americanus* (Pers.) Hara, Bot. Mag. (Tokyo), xlix. 115 (1935), entirely ignoring the fact that Persoon's *Spiraea Aruncus*, var. *americana* and all names dependent upon it are substitutes for *S. Aruncus*, β . *hermaphrodita* Michx., which is *Astilbe* of the *Saxifragaceae*.

(To be continued)

THREE JUNIPERS OF WESTERN TEXAS

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A CONFUSION or misconception of certain species of North American junipers has long existed. For our purpose it suffices to go back only

as far as the acceptance by Engelmann of a species of the states of the Pacific Coast, *Juniperus occidentalis* Hooker, as occurring in Texas. The species to which he referred is known now as *J. mexicana* Spreng. In addition to this Engelmann described and named two varieties of *J. occidentalis* as occurring in Texas, namely vars. *conjugens* and *monosperma*. The first of these does not appear to be a good variety. As to the second of these it appears that Engelmann included more than one thing in the conception of his variety *monosperma*. In the first place this variety was distinguished from the species by having smaller bluish-black fruits with one or more less grooved seed. Had he stopped here it is granted that he would have indicated a good variety of the species which he was considering to be *J. occidentalis*, but not of that species as now known. However, he goes on to state: "In Colorado the berries are often copper-colored, as Parlatores describes those of the species (*J. occidentalis*) and in some trees the seeds protrude." The parentheses are the writer's, while the quotation is from Trans. St. Louis Acad. Sci. 3: 590. 1877. It does seem that the quoted part of his description refers to something entirely different from the preceding portion of the same.

Considering first that part of Engelmann's description of his variety *monosperma* referring to its characterization by having smaller bluish-black berries with one or more less grooved seed, Sargent in 1889 recognized such a juniper as distinct from *J. occidentalis* and raised it to specific rank. Study of herbarium material, accepted by the Arnold Arboretum as authentic for both *J. mexicana* and *J. monosperma*, in fruit, seed, and other characters convinces the writer that the differences are insufficient for maintenance of the latter as a distinct species. It is his opinion that the latter should be recognized as a geographical variety of the former, its occurrence apparently being largely, if not entirely, north of the occurrence of the typical form of the species, and that it should be known as

JUNIPERUS MEXICANA Spreng., var. **monosperma** (Engelm.), new comb. *J. occidentalis*, β . *monosperma* Engelm. Trans. St. Louis Acad. 3: 590 (1877).

Now considering that part of the description previously quoted, it seems to the writer that this refers to the juniper that was described by Lemmon in 1895 as variety *gymnocarpa* of Hooker's *J. occidentalis*. In 1915 Wootton and Standley refer to this particular juniper on page 58 of "Flora of New Mexico," and make the following statements:

“What is probably a form of *J. monosperma*, or possibly a distinct species, was described by Lemmon as *Juniperus occidentalis gymnocarpa*. It is said to have the solitary seed partly exposed at the apex, hence the name. Mr. Lemmon states that this form is ‘abundant on the Sandia Mountains, near Albuquerque,’ New Mexico. No specimens have been seen by the writers. The same form has been collected near Fort Huachuca, Arizona, by Gen. T. E. Wilcox.” Field experience together with study of herbarium material convinces this writer that Lemmon’s variety is a good species, and that it should be recognized as such by the name

Juniperus gymnocarpa (Lemmon), new comb. *J. occidentalis*, var. *gymnocarpa* Lemmon, West Am. Cone-Bearers, 80 (1895).

Juniperus gymnocarpa is clearly distinct from all other junipers in the mountains of southwestern Texas, while in fully mature fruit it is obviously distinct from all other described junipers. In southwestern Texas this species is a tree with a stout trunk, not branched for some distance above the ground, the branches spreading, relatively not stout, and forming an irregular head with dense foliage. The mature fruit is reddish-brown in color, but noticeably smaller than the fruits of other junipers of Texas having similar color in the mature fruit. The characteristic feature of the mature fruit, which marks it as a distinct species, is that the solitary seed, which is large for the cone containing it, is exposed at the tip for as much as one-fourth or more of the length of the seed. At maturity the fruits are broader than long, whereas preceding maturity they are not. Well-developed, fully mature fruits are about 5 mm. broad and 4 mm. high, with the exposed portion of the seed measuring as much as 1 mm., or slightly more, in height. The top of the cone consists of a thickened ring, with the diameter of the opening varying largely with the maturity of the fruit, with immature fruit, even when copper-colored, having no opening whatsoever, and mature fruit with an opening 2–3 mm. in diameter, the opening being somewhat ellipsoidal. As a concrete example, the following details are taken from one of the smaller, but fully mature fruits. The fruit is 3.5 mm. broad and 3 mm. high, with the exposed end of the seed projecting a full millimeter beyond, and with the opening of the apical cone-ring 2.5 mm. in diameter. The seed is pyriform, the basal part smooth and rounded, almost hemispherical, and above the basal part it is 2-winged, the wings gradually widening above, extending only to the edge of the exposed portion of the

seed, there truncate and supporting the apical ring of the cone. The seed is 4 mm. high, 2.7 mm. broad at its major diameter, and 1.5 mm. broad at the base of its exposed portion. The included portion of the seed is light-colored, while the exposed portion is dark-colored, dome-shaped, and with the center marked by a low, circular, blunt crateriform point 0.3 mm. in diameter, noticeably darker colored than its immediate surroundings.

This species of the mountain valleys of southwestern Texas apparently has a distribution westward through New Mexico to Arizona and north therefrom to southern Utah, Nevada, and Colorado, and possibly southward into Mexico. In Texas it grows only in the mountains, and there only in the higher valleys or on the mesa-like tops of the mountains of lower elevations. Its zone of occurrence is above that for *J. Pinchoti* and below that of *J. erythrocarpa*, and more or less coextensive with the zones of *J. pachyphloea* and *J. flaccida*, both of which species may be found at lower elevations than *J. gymnocarpa*.

Representative material deposited in the herbaria of the Arnold Arboretum and the Missouri Botanical Garden comes from a tree ten miles up Frazier Canyon from State Highway No. 17 in Limpia Canyon of the Davis Mountains, and was collected November 3, 1934.

The failure heretofore to recognize this juniper as a distinct species is quite probably due to the fact that the immature fruit, even after assuming the reddish-brown coloration, does not exhibit the characteristic exposure of the end of the seed. Because the fruit is strictly 1-seeded and, also, because it evidently was included by Engelmann in his variety *monosperma*, this species, in the absence until the present of special study devoted to it, has been considered heretofore either as *J. monosperma* itself or as a variety thereof. The present study is convincing that it is distinct.

While *J. gymnocarpa* long has been known in a more or less general way, another 1-seeded juniper, now shown to be distinct, if known at all was accepted likewise as being either *J. monosperma* itself or a form thereof. The writer first noted this species on August 27, 1927, on top of the Davis Mountains at a point about eight miles northwest of Alpine and about two miles directly south of Mitre Peak. Its mature bright-red, fleshy, 1-seeded fruits at once set it apart from the other species of junipers growing in these and other mountains of

southwestern Texas. However, it was more than six years later before further opportunity for study of this species was afforded. It was then that a special trip covering a thousand miles was rewarded by finding this juniper in mature fruit and in some abundance on the top of the Chisos Mountains, at least 85 miles on an airline south and east of the previous station. Material collected here on December 2, 1933, from the trees bordering the laguna at the west base of the peak of Mt. Emory is used for describing the new species.

JUNIPERUS erythrocarpa, sp. nov. Arbor parvus plerumque minus quam 5 m. altus, ramis adscendentipatentibus; fructibus maturis globosis diametro 6–8 mm. plerumque circa 8 mm. rubris carnosis monospermis; semine pyriformi circa 5 mm. longo 4 mm. lato, pallido, supra basin laevem rotundatumque prominenter bicarinato, vitta fusca dimidiam partem superficiei tegente, in parte superiore faciei utraeque foveis tribus ellipticis 1 mm. vel ultra longis et ad fines vittae 1 vel 2 foveis duplo majoribus ornato.

A small tree, mostly under 5 m. in height, with branches ascending-spreading and forming an open, irregular head; mature fruits globose, 6–8 mm. in diameter, mostly near 8 mm., bright-red, fleshy, 1-seeded; seed pyriform, relatively broad, approximately 5 mm. long by 4 mm. broad, light-colored, above the smooth and rounded base prominently 2-ridged and marked by a dark-colored ridge-band, which covers as much as one-half or more of the surface of the seed, and further marked by 3 concavities, 1 mm. or more long and half as wide, on the upper part of each of the two faces, and either 1 or 2 concavities, about twice as large at each end of the ridge-band.

Representative material of this collection, from West base of peak of Mt. Emory, December 2, 1933, no. 7642 (TYPE in Herb. Arnold Arboretum) is deposited in the herbaria of the Arnold Arboretum and the Missouri Botanical Garden.

Juniperus erythrocarpa is a small tree growing at the higher elevations in the mountains of southwestern Texas, and it should occur also across the Rio Grande in the mountains of Mexico. In Texas this juniper is unique in the striking coloration of its mature fruits and in the strong markings of its seeds. A seed 5 mm. long and 4 mm. broad at its major diameter has a smooth, hemispherical, light-colored base, with the rounded ends of the dark-colored ridge-band beginning at slightly more than 1 mm. above the center of the base on opposite sides, here being 3 mm. broad, but broadening as they rise into an arch which covers the apical end of the seed. On both sides the ridge begins just above the end of the ridge-band and is continuous across the obtuse apical end of the seed, which is flattened in one plane and

acute in a plane at right angles thereto, and not at all dome-shaped, as in *J. gymnocarpa*. At the center of the apex of the seed, or slightly to one side of the center, the ridge bears a darker-colored circular point, which is approximately 0.25 mm. broad and almost as high. The dark-colored ridge-band covers from about one-half to as much as three-fourths of the surface of the seed, the relatively longer seeds being less rounded at the base and having more of their surface covered by the dark-colored band. The concavities are oblong, rounded, shallow depressions regularly and uniformly arranged on opposite sides of the seed. Each face has 3 similar concavities on its upper portion, all 3 situated partly in the light-colored area and partly in the dark-colored area, except that in the longer and narrower seeds one of these concavities lies wholly within the dark-colored area. Likewise at each end of the dark-colored ridge-band are situated 1 or 2 concavities, about 2 mm. long and 1 mm. broad, and slightly deeper than the upper concavities. In the relatively broad seed there is usually one such concavity, and this lies partly in the light-colored area and partly in the ridge-band area, the ridge itself beginning in the concavity, whereas in the longer and narrower seed there are usually 2 concavities at each end of the ridge-band, and situated wholly within its area, being narrowly separated by the ridge, the angle of which is markedly accentuated by the proximity and depth of the two concavities.

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NOTES FROM THE HERBARIUM OF THE UNIVERSITY
OF WISCONSIN—XIV

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VICIA CRACCA AND ITS RELATIVES IN NORTH AMERICA. The range of *Vicia Cracca*, as usually described, includes most of the Middle